REMARKS

Claims 1-7 are in this application. Claims 1-3 are rejected. Claims 4-7 have been allowed. Claims 1, 2 and 6 are amended herein to clarify the invention. New claims 8-11 are added. Applicant provides herewith an Interview Summary in accordance with 37 CFR 1.133(b).

Claims 1-3 are rejected under 35 U.S.C. § 102(b) as being anticipated by the Quinn reference. Applicant herein respectfully traverses these rejections. "Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, *arranged as in the claim.*" ***Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.***, 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added). It is respectfully submitted that the cited reference is deficient with regard to teaching the claimed shorting of the positive and negative battery electrodes by the operation of the switch element.

Claim 1 recites the following feature of the invention which operates to protect a battery in response to a temperature change:

> a switch element attached to the battery case and interposed in a circuit for connecting the battery to an external power source in an initial state of operation, the switch element completing a charging path to the external power source in the initial state of

> operation, the switch element operating, in response to a first change in temperature of the battery, to disconnect the charging path of the battery and establish a short circuit across the positive electrode and the negative electrode in a second state of operation[.]

Applicants respectfully submit that the Quinn reference fails to disclose or even suggest a switch element in combination with a battery, wherein the switch element is responsive to temperature in a manner to establish a short circuit across positive and negative electrodes of a battery.

In the rejection the Examiner references various figures (Figs. 1, 22, 24, 28, and 29) of the Quinn reference but appears to rely primarily upon Fig. 29 which shows a normally open switching element of Figs. 22-24 (Col. 9, lines 54-61) for controlling a charging circuit M via a controller K. The Examiner states the following:

> Figure 29 shows the charging circuit (M) as the external power source which is in electrical contact with the battery. In one embodiment, metal terminal plate (96) has fixed contact (10a) attached thereto and isolated therefrom by electrical insulation (12a).

Based on the Examiner's own observation that the fixed contact 10a is isolated from the terminal plate 96, the fixed contact 10a does not make contact with a battery terminal. Hence, the closing of the contact by memory element 40a can only complete a connection between terminal plate 96 and fixed contact 10a to

close the circuit between leads 250 and 252 running to the controller K. The Quinn reference's entire description of the operation is as follows.

> By way of example, the arrangement of FIG. 29 may be used in a system that has a plurality of individual cells that are constantly charging, such as in an electrochemical cell package that includes a plurality of individual cells for an electric vehicle. Each individual cell would have a sensing switch in accordance with the present application associated with the cell housing to sense an excessive pressure or temperature condition. When such a condition is sensed, the switch closes to send a signal to controller K for cutting off charging current to that particular cell while leaving the remaining cells in service. Other normally open embodiments may be used in the same manner. Col. 9, line 62 to col. 10, line 6.

Thus, the Quinn reference teaches that the switch element may be used as a sensor for a controller logic circuit K. The switch element's only connections are with the controller logic circuit K. In response to closure of the switch, the controller logic circuit K cuts off charging of the battery cell N. There is absolutely nothing disclosed concerning the claimed operating to "establish a short circuit across the positive electrode and the negative electrode in a second state of operation" of the switching element.

Furthermore, from the above explanation of the embodiment shown in Fig. 29, it is clear that there is no teaching of "a switch element attached to the battery case and interposed in a circuit for connecting the battery to an external power source in an initial state of operation." In Fig. 29, the charging circuit M is connected to the electrode terminals for charging 264 and 262 via leads 258 and

260. None of the switch connections, the terminal plate 96 or the fixed contact 10a, are electrically connected to the battery cell N. As is clear, material 32a is an insulator since it corresponds to the insulating washer 32 of Fig. 1 (Co. 5, lines 30, 31) as is the material of the flex arm 48 and bumper 42a which is formed as part of the insulator ring C of the embodiment of Fig. 1. (Co. 5, lines 53-59). Accordingly, the terminal plate 96 and the fixed contact 10a are not connected to the positive or negative electrodes of the battery. Hence, the Fig. 29 does not remotely teach "a switch element ... *interposed* in a circuit for connecting the battery to an external power source" as the battery cell N has electrodes 264 and 262 solely connected via leads 258 and 260 to the charging circuit M. The normally open switch assembly in Fig. 29 is merely used as a sensor to control the charging circuit M hence it is called a "signal circuit." Discharging is not effected since the switch assembly does not relate to the charging contacts 264 and does not effect shorting of the battery. Furthermore, even if the switch element controls the battery charging circuit M via the control logic k, absolutely nothing in the reference suggests short circuiting the battery electrodes as claimed.

Apparently in an effort to establish a teaching of a switch element having a terminal connected with a battery electrode, the Examiner has referenced Figs. 22-24 and 28 which show a totally different application of a switch element of

which none are capable of effecting discharging of the battery based on the Quinn disclosure. The Examiner states in the initial portion of the rejection the following:

> With respect to claim 1, Quinn et al. teach a rechargeable battery comprising a positive electrode, a negative electrode, and a switch (40 in Figure 1). Quinn et al. also disclose a battery case (200) comprising a wrapped multi-layer assembly J that forms the battery electrodes. One electrode of the electrode assembly J is attached to fixed contact (10) by wire (210) while the other electrode is connected to battery case 200. Figure 28 show the fixed contact (10) is the positive battery terminal while the battery case and the lid are the negative terminal. The switch having closed and open positions moves from one position to the other in response to an elevated temperature. Circuit devices, including the switch, are used to interrupt charging or discharging of the battery in the event of thermal runaway.

This recitation is apparently based on the switch embodiment of Fig. 1 applied to the battery cell application of Fig. 28. However, while the Examiner avers that the reference teaches that "circuit devices, including the switch, are used to *interrupt* charging or discharging of the battery in the event of thermal runaway," this in no way suggests that, in response to a temperature change, the switch disconnects the battery from the circuit connecting it to an external power source and "establishes a short circuit across the positive and negative electrodes."

Applicant further notes that while the reference clearly does not disclose short circuiting the battery electrode, the Examiner has identified absolutely no motivation for one to short circuit a battery and thereby discharge it. Such an

operation is counterintuitive because this would cause discharging of the battery without effecting work in the system to which the battery is connected. It would draw current which would produce heat. It is only in the applicant's disclosure that would provide a reason to short circuit the battery. The short circuit feature of the present invention provides an important advantage over the cited art. If a battery is left in an overcharged state at a raised temperature, leakage of electrolyte is likely to occur which deteriorates the battery and may damage the device which the battery is used in. The short circuit feature alleviates the overcharged condition. Nothing suggests this in the prior art cited.

Fig 28 shows an embodiment of the switch assembly of Fig. 1 which is normally closed and is incorporated in into a standard battery having a negative electrode case 200 and contact 210 providing positive electrode contact to the fixed contact 10. The switch blade 40 is in a normal closed position connecting positive electrode 210 via contact post 10 to the terminal plate 30 which is an outside accessible contact for the positive electrode 210. As shown in Fig. 11, when the switch blade 40 becomes heated, it bends upward disconnecting the positive electrode from the terminal plate 30. This operation is described as follows:

> The configuration of the switch components normally would be as shown in FIG. 1 to provide for discharge and recharge of a battery. In response to an elevated temperature condition and/or in response to I^2R heating of switch blade 40, the switch blade

> moves from its closed position to the open position shown in FIG. 11 by assuming its recovered shape at the predetermined austenitic transformation temperature of the alloy.

As will be clearly noted, the closed position is for charging *and* discharging the battery whereas the open position disrupts both actions. Nothing suggests *disconnecting* the battery from the circuit for charging *and* short circuiting the battery in response to a first change in temperature.

The Examiner next references the embodiments shown in Figs. 22-24 stating the following:

> Switch blade (40a) of shape memory metal in Figure 22 moves from an open position to a closed position as shown in Figure 23 by changing to its recovered shaped in response to an elevated temperature in the chamber. As shown in Figure 24, a short circuit is established across the positive electrode (10a) and the negative electrode (96) due to changes in temperatures. The switch blade will return to its initial state as the temperature is reduced.

However, it is respectfully submitted that the Examiner, having referenced numerous embodiments in the reference in an attempt to fuse them together, is misinterpreting the reference by reading in portions of the embodiment of Fig. 1 into the reference. The statement "as shown in Figure 24, a short circuit is established across the positive electrode (10a) and the negative electrode (96) due to changes in temperatures" is clearly not supported for the same reasons presented above with regard to the embodiment of Fig. 29, wherein the

embodiment of Figs. 22-24 is used. Indeed, no connections are shown between the switch blade 40a or the fixed contact 10a and the battery electrodes. As is apparent in the figures, switch blade 40a moves from a position in Fig. 22 where it is in electrical contact with *only* the metal plate 96, since the remaining elements it and the metal plate 96 contact are insulators, that is, material 32a is an insulator since it corresponds to the insulating washer 32 of Fig. 1 (Co. 5, lines 30, 31) as is the material of the flex arm 48 and bumper 42a which is formed as part of the insulator ring C of the embodiment of Fig. 1. (Co. 5, lines 53-59), to a position contacting the fixed contact 10a in Fig. 10a which is itself isolated. Accordingly, the terminal plate 96 and the fixed contact 10a Figs. 22-23 are not connected to the positive or negative electrodes of the battery.

With regard to the embodiment of Fig. 29, there is no connection shown between the terminal support plate 96 and a negative terminal of the battery. When the switch closes charging is stopped. Col. 10, line 2-5.

Claim 2 recites the configuration of the plates of the switch element of which one is connect to an electrode. With regard to the rejection of claim 2, the Examiner states:

> With respect to claim 2, the switch blade is in contact with a flexible arm (50) (first conductive plate) in an initial state and is connected fixed contact (a second conductive plate) in response to a change in temperature of the battery.

This statement is not at all understood. First, the Examiner has not identified what figure he is referring to. Applicants have reviewed the reference and have found that reference numeral 50 is used in Fig. 6 to refer to a flexible arm which is clearly not a "conductive plate." The specification states the following:

> With reference to FIGS. 5 and 6, dielectric support C has top and bottom surfaces 44, 46, and peripheral recess 24 is located adjacent top surface 44. Bumper 42 is *molded integrally* in one-piece with insulator C and extends into insulator opening 22 from one end thereof Bumper 42 is connected with the main body portion of *insulator C* by flexible arms 48, 50. (Col. 5, lines 53-59; emphasis added)

As is readily evident in Fig. 6, the flexible arm 48 is formed integrally of the insulator material C. Accordingly, the proposed grounds for rejection are not supported by the reference.

In view of the above, it is first submitted that the rejections are improper because the Examiner is inappropriately reading in connections from certain embodiments into other embodiments where they are contrary to the teaching of those embodiments. The application of Fig. 29 does not use the connections shown in Fig. 28. This is clearly inappropriate in an anticipation rejection because the reference must show the elements arranged as in the claims. In the present rejection, the Examiner has chosen to pick connections from one

application and read them into a totally different application of the switch element. As such, the rejection must fail on its face.

It is further submitted that the rejection must fail because the reference simply does not teach the switch element interposed in a circuit for charging, completing a charging path, switching to a configuration short circuiting the electrodes of the battery. At best, Fig. 29 shows a switch element connected to a controller circuit which controls a charger. This arrangement in no way shows a switch element interposed in a circuit for charging or a charging path

It is still further submitted that the rejection fails because, as noted in numerous instances above, the Examiner has mischaracterized the disclosure of the reference.

And finally, even if the Examiner were to attempt to base an obviousness rejection on the reference, such a rejection must fail because the reference in no way suggests or provides motivation for a switch element establishing a short circuit across electrodes of a battery.

In view of the above, it is respectfully submitted that claims 1-3 particularly describe and distinctly claim elements not disclosed in the cited reference. Therefore, reconsideration of the rejections of claims 1-3 and their allowance are respectfully requested.

In accordance with MPEP 706.02(j), when a claim is rejected the Examiner should set forth "the relevant teachings of the prior art relied upon, preferable with reference to the relevant column or page number(s) and line number(s)." In order for the applicant to respond appropriately, it is respectfully requested that, in the event the pending claims are again rejected based on the cited reference, the Examiner set forth the relevant teachings in the cited references with reference to relevant column and line numbers or reference designators.

In light of the foregoing, it is respectfully submitted that the application is in proper form for allowance of all claims and notice to that effect is earnestly solicited. Please charge any fee deficiency or credit any excess payment to Deposit Account No. 10-1250.

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enc.: Interview Summary